



ENGR 328 – Design and Fabrication with Modern Materials

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Class Overview

Design and Fabrication with Modern Materials introduces current manufacturing processes and rapid prototyping techniques. These include, but are not limited to, 3D printing (fusion deposition modeling and stereolithography), mold making and casting, thermoforming, laser cutting, and micro-fabrication. This class also introduces mass manufacturing techniques and the evolution of commonly used techniques (i.e. – lean manufacturing).

Students used Solidworks modeling and rapid prototyping techniques to design and fabricate selected products from a range of commonly used materials (i.e. – wood, acrylic, PDMS). The two most common machines used in ENGR 328 were a Glowforge laser cutter (Fig. 1) and a range of 3D printers (Fig. 2).



Fig. 1. Glowforge Laser Cutter

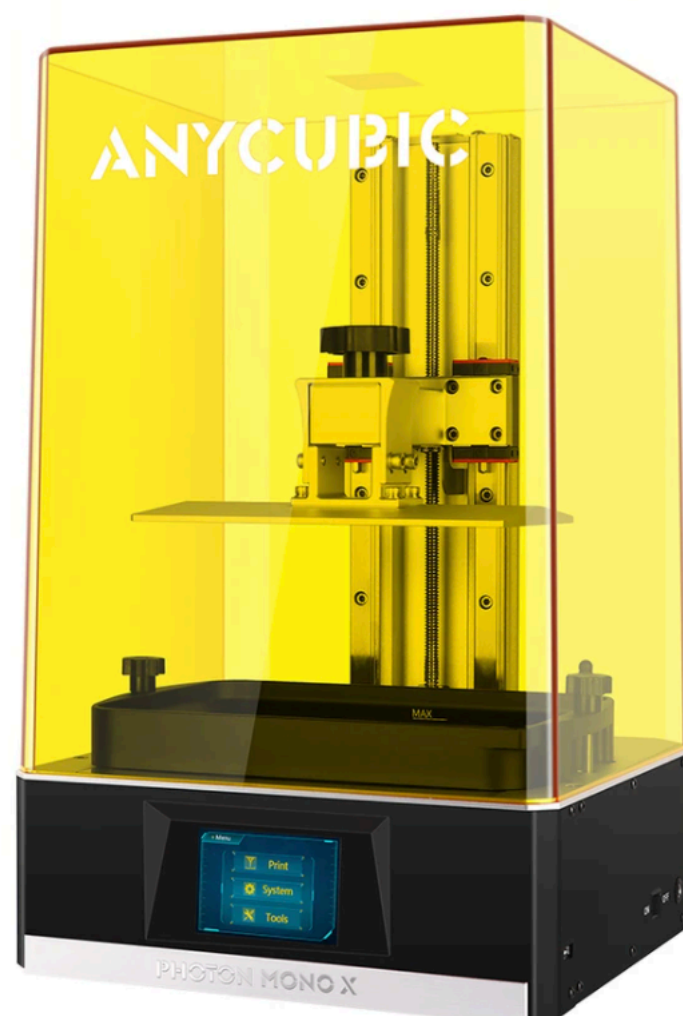


Fig. 2. MSLA 3D Printer

Laser-cut Lamp Project

One of the projects in ENGR 238 was to design and build a lamp assembled from laser-cut plywood. The students began with sketches of their initial design to determine how the 2D laser-cut parts will be assembled into a 3D object. The students then modeled their designs in Solidworks and generated drawings of each part in their assembly, which could then be laser cut using the Glowforge laser cutter. The final design was required to house a provided light and is shown below in Figure 3.



Fig. 3. Final Products for Laser-cut Lamp Project

Molding and Casting Project

Another selected project in ENGR 328 dealt with developing replicates of 3D printed parts using molding and casting. The students first learned how to make professional-grade images of Solidworks parts using rendering. They then 3D printed their parts and developed molds from the parts, from which a plastic part could then be casted (Fig. 4). Once a mold was developed, students could replicate their 3D printed parts in a fraction of the time. Figure 5 displays casted parts the students developed.

3D Printed Part → Mold of Part → Casted Part

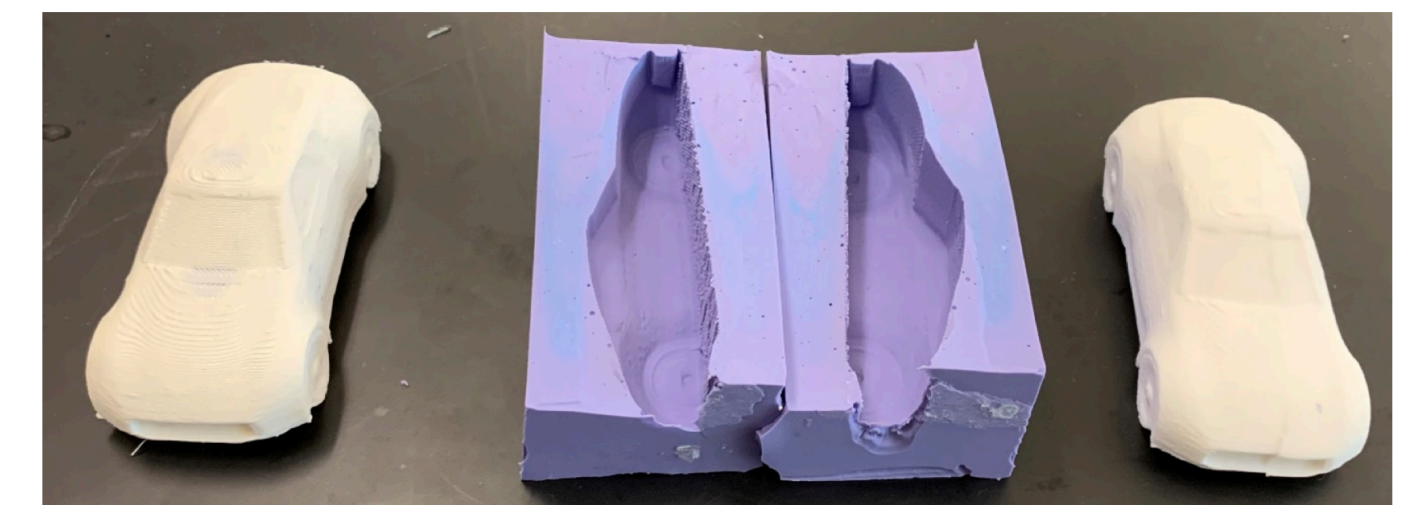


Fig. 4. Molding and Casting Process.



Fig. 5. Final Products for Molding and Casting Project